Virtual biobanking to enhance collaboration and specimen use in infectious diseases

APPRISE
AUSTRALIAN PARTNERSHIP FOR PREPAREDNESS RESEARCH ON INFECTIOUS DISEASE EMERGENCIES

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Acknowledgement of country

What is a biobank?

- An organised collection of biological samples for research use
- Biological samples can include blood, saliva, skin, tumour…
- May also include clinical/health data
- Varying levels of organisation/sophistication
- Expensive!

Image: Microgen/Shutterstock.com

Biobanks support diverse research

- Diagnostic development (molecular, point of care)
- Pre-clinical treatment evaluation
- Natural history of infection
- Sub-population susceptibility
- Omics (genomics, proteomics, metabolomics, transcriptomics
- Biomarker identification
- Vaccine responses

Biobanks in Australia

- Highly organised biobanks for some conditions (e.g. cancer, rheumatology) and in some locations (e.g. NSW)
- Infectious disease biobanks are mostly small and study specific
- Many collections are internal – no visibility or formal process for access

Opportunities:

- Make samples more visible and easily accessible
- Maximise utility of samples already collected
- Prepare for pandemic response

Biobank requirements

Participants	Researchers
▪ Address equity	
▪ Facilitate informed consent	
▪ Protect privacy and confidentiality ▪ Enable ongoing involvement, including in governance ▪ Provide relevant results, where possible	▪ Ensure data and sample quality ▪ Provide good governance and transparency ▪ Address community concerns ▪ Provide reliable stewardship of data and samples

Vision

A biobank for infectious disease emergencies should:

- Be multi-jurisdictional
  - pre-emptively address some of the governance and logistical issues that are required for cross-jurisdictional specimen and data transfer
- Have clearly defined governance structures
  - including clear access protocols and scope of research possible with ethical approval
- Be reactive to disease outbreaks
  - able to be fed into and accessed quickly
- Be linked to both public health units and research organisations

APPRISE National Virtual Biobank

1
Integrate access to existing biosample collections

2
Develop common framework for data models associated with collections

3
Build a secure web-based portal

- APPRISE is are working BioGrid Australia to build a virtual biobank portal and the associated systems to integrate multiple collections

APPRISE National Virtual Biobank

Establish project governance

Contracting with BioGrid and setup of Steering Committee with phase I collections

Build Virtual Biobank Portal

Technical development and testing

Address ethics & governance issues

Site-specific approvals and agreements

Virtual Biobank Launch

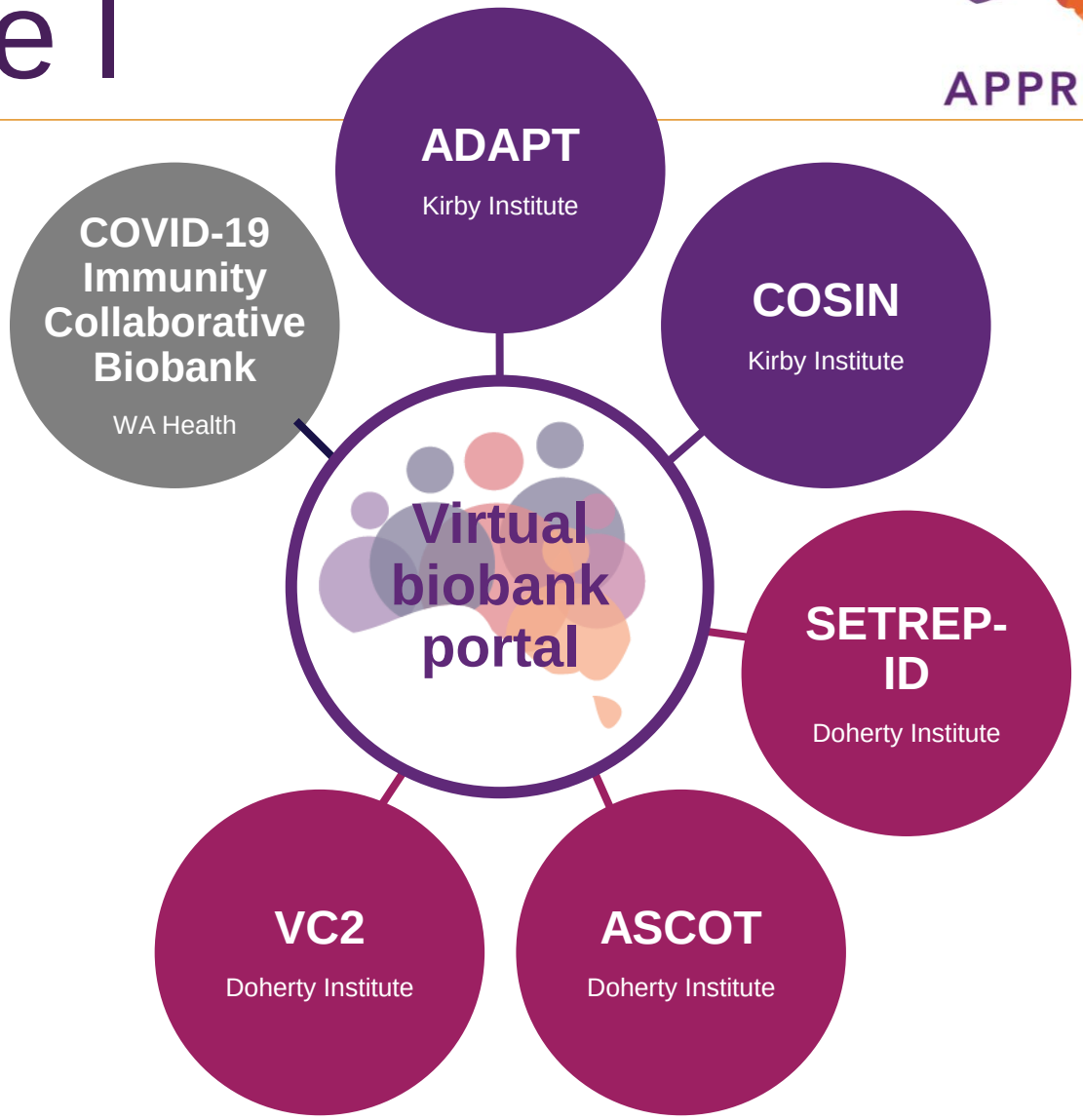
November 2023

Phase II

Virtual biobank phase I

- All COVID-related collections
- Minimum information searchable via portal
- Collections retain existing ethics and governance arrangements

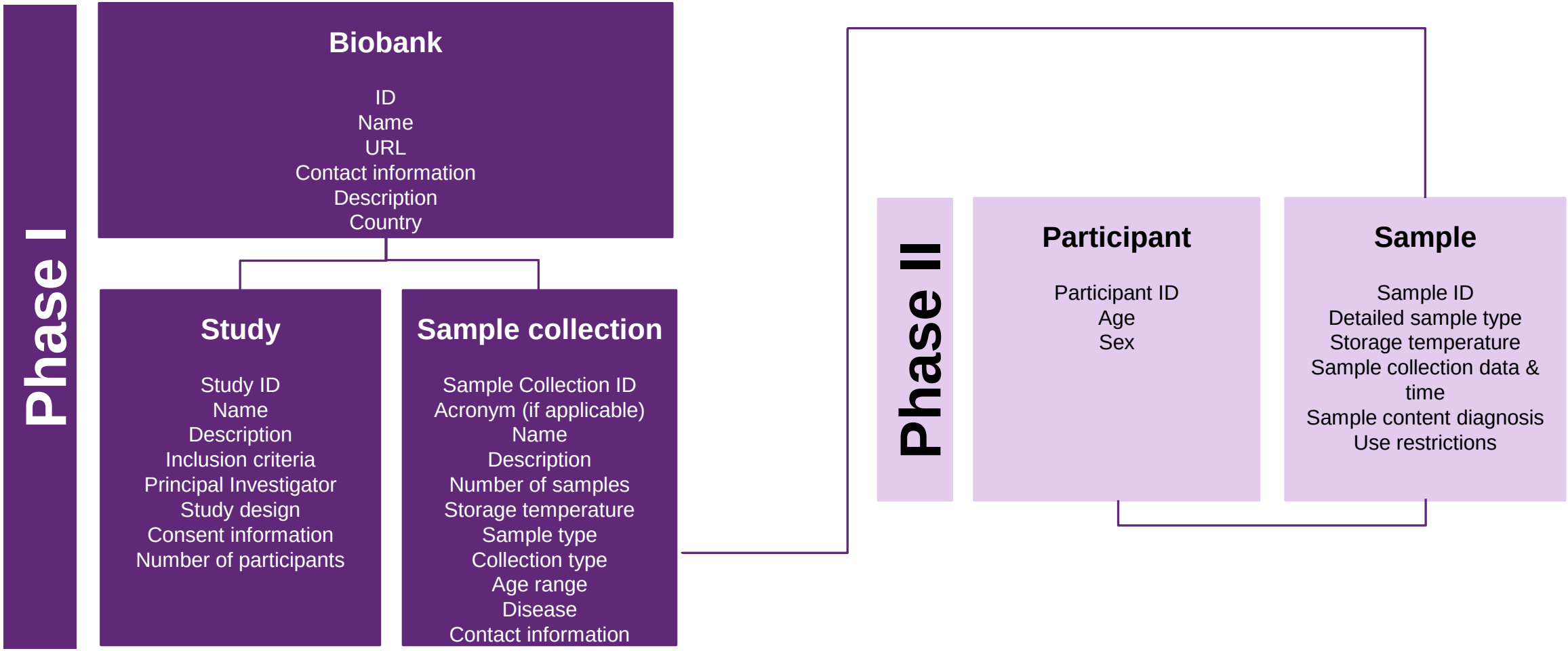
52,928 Samples available	**15** Sample types
821 Participants	**5** Collections



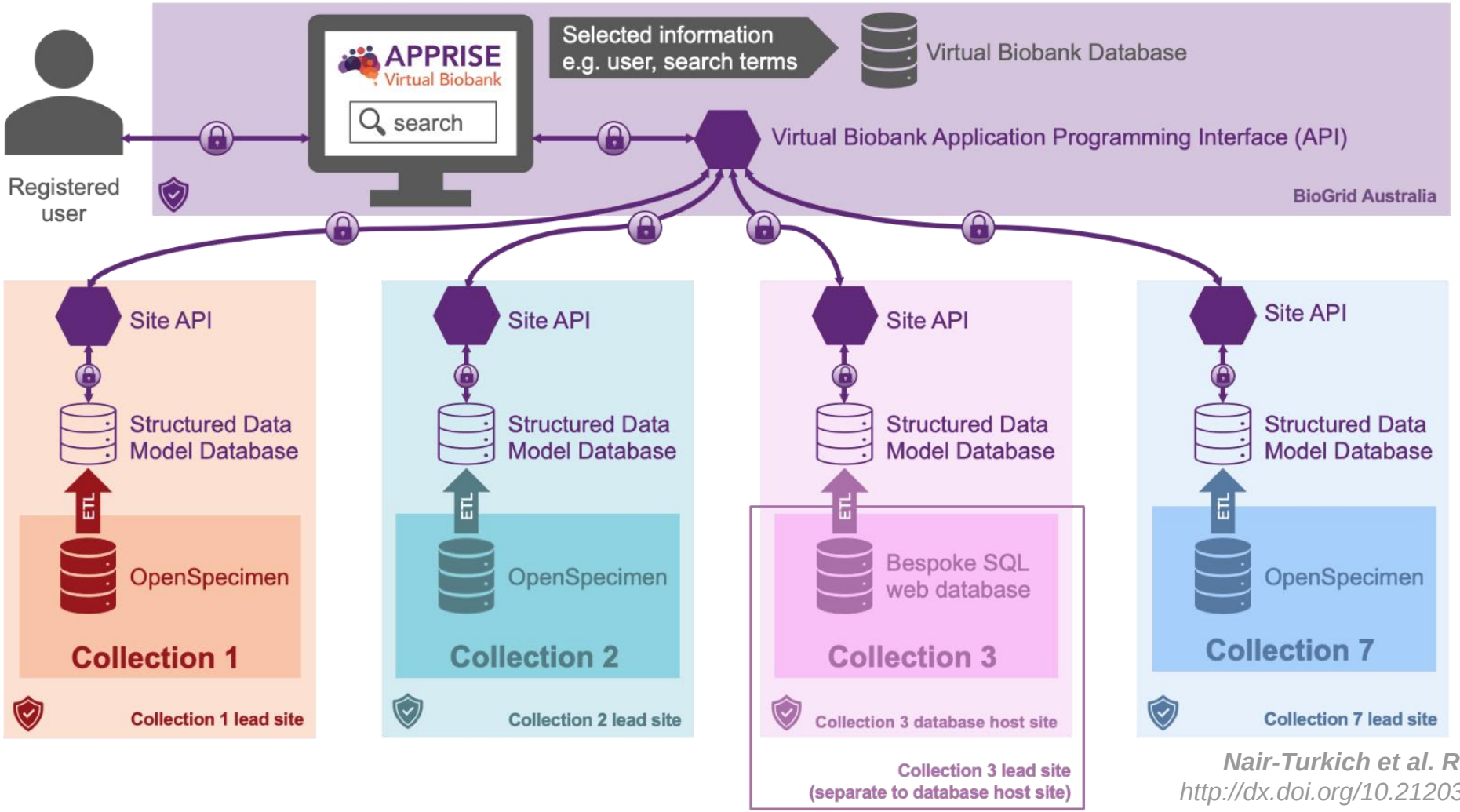
Minimum Information About BIobank data Sharing (MIABIS)

- Developed by the Biobanking and BioMolecular Resources Research Infrastructure of Sweden (BBMRI.se) in 2012 and since updated to MIABIS 2.0
- Community-generated framework for standardising data *in* and *about* biobanks and biospecimens
- Modular: core data on the biobank itself, separate modules for sample collections, studies and donors
- Adapted to generate a Minimum Information Model

Minimum Information Model



Technical structure



Nair-Turkich et al. Research Gate 2024
http://dx.doi.org/10.21203/rs.3.rs-4826447/v1

Ethics and governance

Ethics approval (HREC/78249/MH-2021)

Protocol details schema and lists participating collections individually

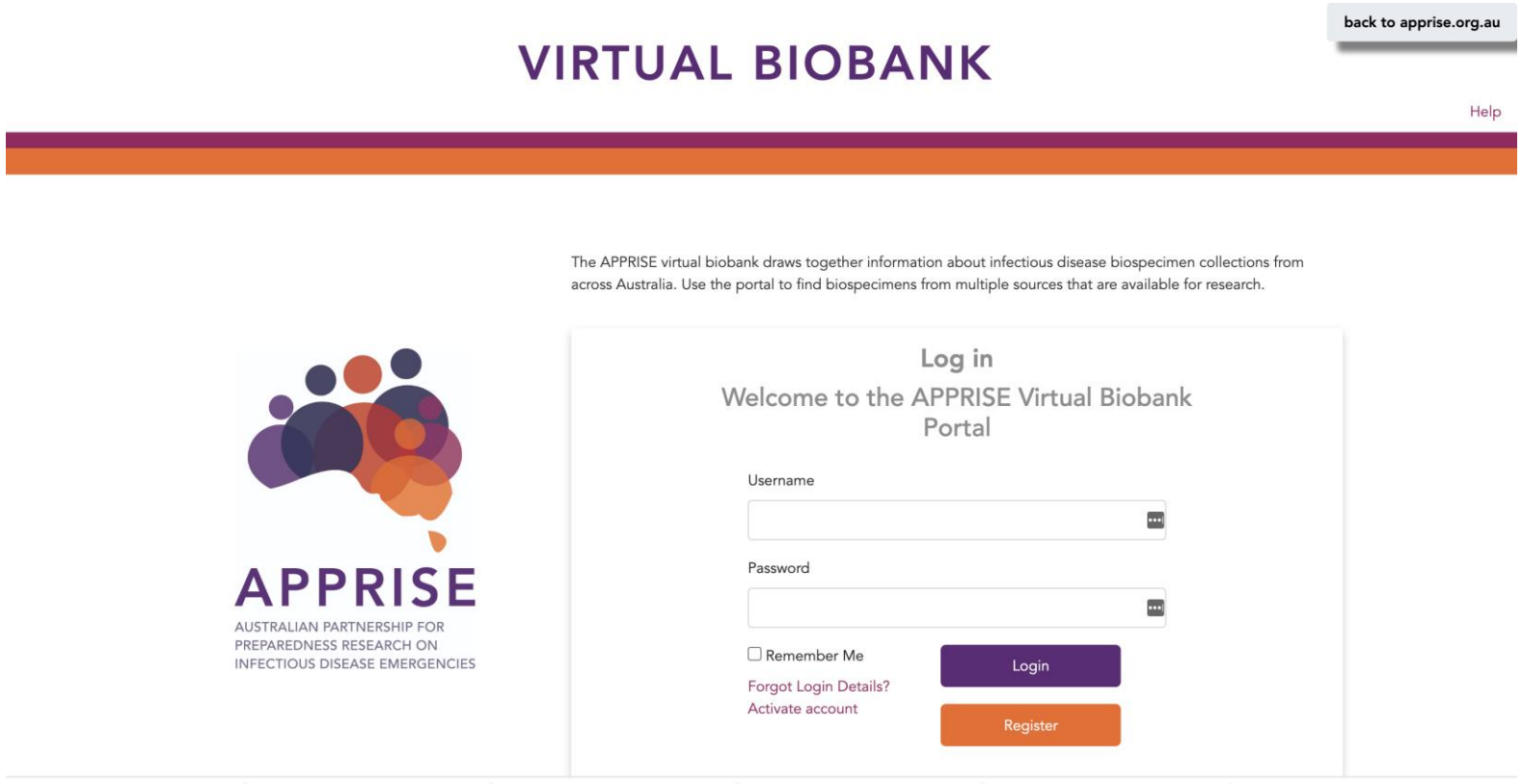
Technical steps

- Identify technical contact point/s
- Database location and schema
- Data dictionary
- IT and security approvals
- Develop technical solution (API or equivalent)
- ‘Extract, Transform, Load’ (ETL) process

Governance arrangements

- Identifying pathway
- Site Specific Approval
- Contract: Clinical Trial Research Agreement
- Invoicing

The APPRISE virtual biobank portal



- Requires account registration
- Secure portal with 2FA

Smith et al. CDI 2023 *https://doi.org/10.33321/cdi.2023.47.66*
Nair-Turkich et al. Research Gate 2024
http://dx.doi.org/10.21203/rs.3.rs-4826447/v1

Beyond phase I

- Integrate further collections
- Develop national sample custodianship governance structures
- Integrate virtual biobank into national biobanking strategy
- Consider data sharing and data return strategies

Phase I

- Limited collections
- All COVID-19
- No governance changes

Phase II

- More collections
- Develop central governance arrangement
- Beyond COVID-19

Phase III

- Integrate with physical biobanking capabilities
- Integrate with National biobanking strategy
- Include pathogens

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